

- 1 1. A method of computing a drift reduction block for use in reducing drift in a
2 block of quantized MPEG discrete cosine transform coefficients, comprising:
3 processing a block of discrete cosine transform coefficients by dropping at
4 least one coefficient in the block;
5 forming a dropped coefficient block containing the at least one coefficient;
6 inverse quantizing the at least one coefficient to produce an inverse quantized
7 dropped coefficient block; and
8 inverse discrete cosine transforming the inverse quantized dropped
9 coefficient block to produce the drift reduction block.
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11 2. The method according to claim 1, wherein the processing comprises
12 dropping at least one coefficient in the block containing high frequency coefficients.
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14 3. The method according to claim 1, wherein the processing comprises
15 dropping a plurality of high frequency coefficients.
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1 4. A method of computing a drift reduction frame for use in reducing drift in a
2 frame comprising blocks of quantized MPEG discrete cosine transform coefficients,
3 comprising:

4 for each block in the frame:

5 processing a block of discrete cosine transform coefficients by
6 dropping at least one coefficient in the block;

7 forming a dropped coefficient block containing the at least one
8 coefficient;

9 inverse quantizing the at least one coefficient to produce an inverse
10 quantized dropped coefficient block; and

11 inverse discrete cosine transforming the inverse quantized dropped
12 coefficient block to produce the drift reduction block.

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14 5. The method according to claim 4, wherein the processing comprises
15 dropping at least one coefficient in the block containing high frequency coefficients.

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17 6. The method according to claim 4, wherein the processing comprises
18 dropping a plurality of high frequency coefficients.

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20 7. The method according to claim 4, further comprising mapping a block of
21 video coefficients to a corresponding block of coefficients in the drift reduction frame
22 using a motion vector.

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24 8. The method according to claim 7, further comprising discrete cosine
25 transforming the block of coefficients in the drift reduction frame.

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27 9. The method according to claim 8, further comprising quantizing the discrete
28 cosine transformed block of coefficients in the drift reduction frame.
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1 10. A method of reducing drift in a block of quantized MPEG discrete cosine
2 transform coefficients, comprising:

3 computing a drift reference block of discrete cosine transform coefficients;
4 mapping the drift reference block to a block of quantized video coefficients,
5 the block of quantized discrete cosine transformed video coefficients having at least
6 one dropped coefficient using a motion vector; and

7 adding the coefficients of the drift reference block to the coefficients of the
8 block of quantized video coefficients that have not been blocked to form a drift
9 compensated block.

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11 11. The method according to claim 10, further comprising variable length coding
12 the drift compensated block.

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14 12. The method according to claim 10, further comprising repeating the
15 computing, mapping and adding for each motion vector in a frame of MPEG video.

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17 13. The method according to claim 10, wherein the computing is carried out by:
18 forming a dropped coefficient block containing at least one coefficient
19 dropped in quantizing the block of quantized MPEG discrete cosine transform
20 coefficients;

21 inverse quantizing the at least one coefficient to produce an inverse
22 quantized dropped coefficient block; and

23 inverse discrete cosine transforming the inverse quantized dropped
24 coefficient block to produce the drift reduction block.

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26 14. The method according to claim 13, further comprising discrete cosine
27 transforming the block of coefficients in the drift reduction block.

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29 15. The method according to claim 14, further comprising quantizing the discrete
30 cosine transformed block of coefficients in the drift reduction frame.

1 16. An MPEG transcoder, comprising:
2 a variable length decoder (VLD) receiving an MPEG bitstream and produces
3 variable length decoded video frames and motion vectors that characterize
4 movement of objects in the video frames;
5 a processor that processes the frames of VLD decoded video by dropping
6 high frequency discrete cosine transform coefficients in blocks of data;
7 a drift reference frame creator that creates a drift reference frame by, for each
8 block in the video frame:
9 processing a block of discrete cosine transform coefficients by
10 deleting at least one coefficient in the block;
11 forming a dropped coefficient block containing the at least one
12 coefficient;
13 inverse quantizing the at least one coefficient to produce an inverse
14 quantized dropped coefficient block; and
15 inverse discrete cosine transforming the inverse quantized dropped
16 coefficient block to produce the drift reduction block;
17 a drift compensator that compensates for drift in video blocks in the frame by,
18 for each motion vector pointing to the frame:
19 using the motion vector, mapping a block in the drift reference frame
20 to a block of quantized discrete cosine transformed video coefficients having
21 at least one dropped coefficient;
22 discrete cosine transforming the block of coefficients in the drift
23 reduction block; and
24 adding the coefficients of the drift reference block to the coefficients
25 of the block of quantized video coefficients that have not been dropped to
26 form a drift compensated block; and
27 variable length coding the drift compensated block.
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1 17. A method of drift compensating a current frame of MPEG video, the current
2 frame having a motion vector associated therewith, comprising:
3 dropping pixels from a reference frame of video;
4 decoding the dropped pixels to form a drift reference frame;
5 mapping a block of video from the current frame to a block in the drift
6 reference frame; and
7 compensating the block of video from the current frame using the block in the
8 drift reference frame.

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10 18. The method according to claim 17, wherein the current frame of MPEG video
11 has a plurality of motion vectors, and wherein the mapping and compensating are
12 carried out for each of the motion vectors.

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14 19. The method according to claim 17, wherein the decoding comprises:
15 forming a dropped coefficient block containing the at least one coefficient;
16 inverse quantizing the at least one coefficient to produce an inverse quantized
17 dropped coefficient block; and
18 inverse discrete cosine transforming the inverse quantized dropped
19 coefficient block to produce the drift reduction block.

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21 20. The method according to claim 17, wherein the dropping comprises dropping
22 at least one coefficient in the block containing high frequency coefficients.

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24 21. The method according to claim 17, wherein the dropping comprises dropping
25 a plurality of high frequency coefficients.

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27 22. The method according to claim 17, wherein the compensating comprises
28 adding the block of video from the current frame to the block in the drift reference
29 frame.

1 23. An MPEG transcoder having drift compensation that compensates a current
2 frame of MPEG video, the current frame having a motion vector associated
3 therewith, comprising:

4 means for dropping pixels from a reference frame of video;
5 a decoder for decoding the dropped pixels to form a drift reference frame;
6 mapping means for mapping a block of video from the current frame to a
7 block in the drift reference frame; and
8 a drift compensator that compensates the block of video from the current
9 frame using the block in the drift reference frame.

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11 24. The apparatus according to claim 23, wherein the current frame of MPEG
12 video has a plurality of motion vectors, and wherein the mapping means and drift
13 compensator map and compensate for each of the motion vectors.

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15 25. The apparatus according to claim 23, wherein the decoder decodes the
16 dropped pixels by:

17 forming a dropped coefficient block containing the at least one coefficient;
18 inverse quantizing the at least one coefficient to produce an inverse quantized
19 dropped coefficient block; and

20 inverse discrete cosine transforming the inverse quantized dropped
21 coefficient block to produce the drift reduction block.

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23 26. The apparatus according to claim 23, wherein the dropping comprises
24 dropping at least one coefficient in the block containing high frequency coefficients.

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26 27. The apparatus according to claim 23, wherein the means for dropping drops
27 a plurality of high frequency coefficients.
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1 28. The method according to claim 23, wherein the compensator compensates
2 by adding the block of video from the current frame to the block in the drift reference
3 frame.

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1 29. An MPEG transcoder having drift compensation, comprising:
2 means for forming a dropped coefficient block containing the at least one
3 coefficient;

4 an inverse quantizer that inverse quantizes the at least one coefficient to
5 produce an inverse quantized dropped coefficient block; and

6 an inverse discrete cosine transformer for inverse discrete cosine
7 transforming the inverse quantized dropped coefficient block to produce the drift
8 reduction block.
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10 30. The apparatus according to claim 29, wherein the forming means comprises
11 means for dropping at least one coefficient in the block containing high frequency
12 coefficients.
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14 31. The apparatus according to claim 29, wherein the forming means drops a
15 plurality of high frequency coefficients.
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1 32. An electronic storage medium storing instructions which, when executed on
2 a programmed processor, carry out a method of reducing drift in a block of
3 quantized MPEG discrete cosine transform coefficients, comprising:

4 computing a drift reference block of discrete cosine transform coefficients;
5 mapping the drift reference block to a block of quantized video coefficients,
6 the block of quantized discrete cosine transformed video coefficients having at least
7 one dropped coefficient using a motion vector; and

8 adding the coefficients of the drift reference block to the coefficients of the
9 block of quantized video coefficients that have not been blocked to form a drift
10 compensated block.

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